

Red List of Ecosystem assessment series

Produced by JNCC and NatureScot, supported by Natural Resources Wales, Natural England, and Northern Ireland Environment Agency.

This resource is one in a series/number of Ecosystem Red List assessments developed to accompany the UK Biodiversity Indicator '[Red List of Ecosystems](#)'. The assessments are available at: <https://jncc.gov.uk/resources/7b922dfc-708b-4c8c-9e6a-e2040447fb39>.

Resilient ecosystems are crucial for preventing biodiversity loss and species extinction. Maintaining healthy ecosystems safeguards the essential services they provide, which are fundamental to human well-being and a thriving economy. However, pressures and threats such as deforestation, overfishing, or climate change, can disturb the balance of ecosystems and threaten their health and functioning. Assessing the level of threat facing ecosystems is important in helping us understand the current status of the environment, and on a practical level, assessments can be used to help prioritise conservation funding decisions and where to take conservation management action on the ground.

The 'Red List of Ecosystems' (RLE) is a global assessment approach set out by the International Union on Conservation of Nature (IUCN). The approach includes consideration of a series of criteria, including change in geographic distribution through time; whether the ecosystem distribution is geographically restricted; evidence for any environmental degradation; and disruption to biotic processes or interactions. We have not carried out the quantitative analyses of the probability of ecosystem collapse necessary to assess criterion E as we do not have the data needed to carry out such analyses consistently. The IUCN methodology is widely used as a robust approach to assessing the status of ecosystems. Further details of the criteria used in these assessments are available on the [IUCN portal](#).

This assessment series sets out the RLE assessment conclusions for ecosystems found in the UK, alongside the details of how the assessment was made, including for each IUCN component criterion. The assessments have been peer-reviewed, and source data is referenced. Once complete, the series will cover the full range of natural and seminatural habitats that occur in the UK, throughout marine, terrestrial and freshwater environments.

Assessments are conducted according to the [Global Ecosystem Typology Level 3](#) (Ecosystem Functional Groups). This enables the assessments to feed into the Kunming-Montreal [Global Biodiversity Framework](#) (GBF) headline indicator A.1 Red List of Ecosystems. This indicator, which has been incorporated into the UK Biodiversity Indicator suite, is designed to measure progress against [Goal A](#) ('Protect and restore') and [Target 1](#) ('Plan and manage all areas to reduce biodiversity loss') of the GBF.

Any gridded maps are derived from public sector information licensed under the Open Government Licence v3.0. Coastline boundary is derived from the Oil and Gas Authority's and Lloyds Register SNS Regional Geological Maps (Open Source).

M1.6 Subtidal rocky reefs

1. Key facts

Ecosystem description: Subtidal rocky reefs are shelf sea habitats formed of minerogenic rocky substrates and cobbles, supporting diverse epifauna including mobile benthic animals (e.g. starfish and gastropods) and small sessile organisms (e.g. turf algae and barnacles). They are distinguished from kelp forests by their lack of a dense macroalgal canopy and also exclude biogenic reefs. Biological communities present are largely determined by abiotic factors such as depth, light, wave action and substrate composition.



Image credit: Circalittoral rock community © JNCC

Overall assessment conclusion: Vulnerable (VU) based on criteria B1a and C2b.

Date assessment published: 02.12.2025 (Please note a correction to the distribution map and figure for the extent of the feature was made on 18.02.2026).

Assessor: Joe Kenworthy (JNCC)

Reviewer(s): Mike Camplin (NRW), Eunice Pinn (NatureScot)

Corresponding habitat classifications:

The following habitats were considered in the production of this assessment:

EUNIS codes: [MB12](#); [MC12](#); [MD12](#)

UK Marine Habitat Classification: Circalittoral rock (and other hard substrata) [CR](#);

Infralittoral rock (and other hard substrata) [IR](#)

2. Assessment against IUCN criteria

Criterion A: Reduction in geographic distribution

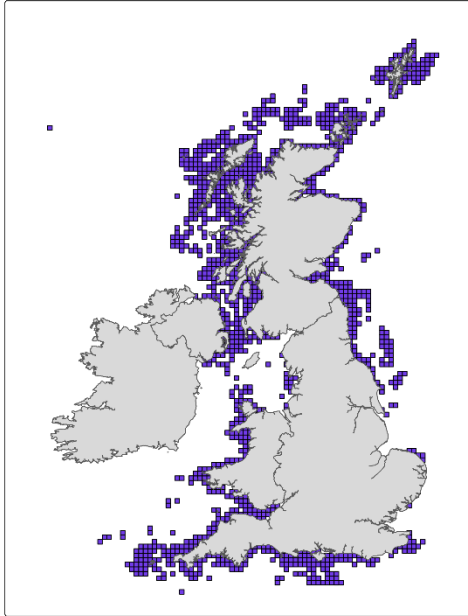
Criterion A considers reduction in geographic distribution over ANY of the defined time periods for criteria A1, A2a, A2b or A3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#)

Subtidal rocky reefs are widely distributed physiographic features. There have been no records of a decline in the geographic distribution of these features (Daera, 2025; JNCC 2019; JNCC, 2025; NatureScot, 2025; NRW, 2025).

Least Concern (LC) – there is no evidence of a reduction in geographic distribution of subtidal rocky reefs

Criterion B: Restricted geographic distribution

Criterion B considers restricted geographic distribution indicated by any of criteria B1, B2 or B3. For details of criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#).



Subtidal rocky reefs are present throughout the UK. Assessments of reefs in the UK typically make a combined assessment of rocky reef and biogenic reef, however the latter only makes up a small proportion of the assessed feature. In the UK, assessments of Annex I Reef indicate that approximately only two thirds of Reef habitat are considered in good condition, and more than 20% not in good condition, with the remainder unknown (DAERA, 2025; JNCC, 2019; JNCC, 2025; NatureScot, 2025; NRW, 2025).

B1a Vulnerable (VU) – The extent of this feature is 7,984 km² (Mountford et al., 2025), it is considered Vulnerable due to poor condition assessments.

Criterion C: Environmental degradation

Criterion C considers environmental degradation over ANY of the time periods for criteria C1, C2a, C2b or C3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#).

There are number of activities impacting subtidal rocky reefs. These include: fishing; infrastructure associated with, for example, renewables, cables, oil and gas; dumping; shipping, pollution and the effects of climate change (DAERA, 2025; JNCC, 2019; JNCC, 2025; NatureScot, 2025; NRW, 2025). Fishing activities impacting sites come from both static and mobile gears. Static fishing gears have the potential to damage communities through abrasion, physical damage and through ropes, anchors and pots dragging over structures (AWFA, 2022; Gall et al., 2020). While rocks are generally avoided by mobile gears, abrasion pressure from fishing can and impact communities (Hinchey et al., 2021). Assessment of broadscale habitats undertaken for the UK Marine Strategy provides evidence of subtidal rocky reefs not meeting Good Environmental Status caused by fishing pressure (Woodcock et al., 2025).

Rocky reefs will be subject to climate change now and increasingly in the future (OSPAR, 2023). While confidence in evidence has increased in recent years relating to the impacts of climate change on benthic habitats, there are still knowledge gaps meaning we are unable to fully assess the scale of community responses in relation to climate change for broadscale habitats (Moore & Smale, 2020).

C2b: Vulnerable (VU). Sites considered degraded due to range of impacts affecting communities across a large proportion of this habitat.

Criterion D. Disruption of biotic processes or interactions

Criterion D considers Disruption of biotic processes or interactions over ANY of the time periods for criteria D1, D2a, D2b or D3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2_EN.pdf](#)

Pollution and contaminants from human activities are prevalent in coastal areas, in particular around estuaries and urban areas (Fowles et al., 2018). Inshore reefs, particularly around estuaries and urban areas are more likely to be impacted by nutrient pollution, which is caused by agricultural activities, urban runoff and point sources (Hawkins et al., 2025). While open coasts and offshore are less likely to be impacted, inputs of nitrogen and phosphorus are continuing to decrease within the UK, although still increasing at a small number of reporting regions (Devlin et al., 2025). Non-native species are known to impact rocky reefs and pose significant impacts (Hawkins et al., 2025), particularly in coastal areas, and around urban areas. However, management efforts are thought to be reducing the rates of introduction (Davison et al., 2025; Stæhr et al., 2022).

Least Concern (LC) – Impacts from nutrient pollution and non-native species are more likely to be observed in inshore, coastal locations. It is expected that the wider efforts to reduce nutrient pollution and the spread of non-native species will be beneficial for subtidal rocky reefs in the longer term.

Conservation measures in place

Subtidal rocky reefs are protected via the Habitats Regulations as a component of the Annex I habitat Reefs. Site-specific Conservation Objectives, information on pressures and threats, and details of the habitats and species are contained within the Conservation and Management Advice packages for each site. From the point of designation of SACs, most human activities with the potential to have adverse effects are managed through a licensing and consents process.

Overall assessment conclusion

Subtidal rocky reefs in the UK are assessed as being Vulnerable (VU) based on criteria B1a and C2b.

3. Literature references

AWFA(2022a). *Pots, Traps & Creels Interactions with Subtidal Bedrock Reef*. Available at: <https://www.gov.wales/sites/default/files/publications/2022-06/pots-traps-creels-interactions-with-subtidal-bedrock-reef.pdf>

DAERA (2025). *Habitats Regulations Report for Reefs*. Publication link when available. Unpublished draft assessment for the period 2019-2024.

Davison P. Garnacho E., Tidbury H., and Matejusova I., (2025). *Non-indigenous species*. UK Marine Strategy 2024 assessment. Available at: <https://moat.cefas.co.uk/pressures-from-human-activities/non-indigenous-species/>

Devlin M., Graves C., Greenwood N., Brooks R., Best M., Napier F., Harrixon T. and Charlesworth M., (2025). *Eutrophication. The extent to which Good Environmental Status has been achieved*. UK Marine Strategy 2024 assessment. Available at: <https://moat.cefas.co.uk/pressures-from-human-activities/eutrophication/>

Fowles, A.E., Stuart-Smith, R.D., Hill, N.A., Thomson, R.J., Strain, E.M.A., Alexander, T.J., Kirkpatrick, J. & Edgar, G.J., (2018). Interactive responses of primary producers and grazers to pollution on temperate rocky reefs. *Environmental Pollution*, 237, pp. 388-395.

Gall, S. C., Rodwell, L. D., Clark, S., Robbins, T., Attrill, M. J., Holmes, L. A., & Sheehan, E. V., (2020). The impact of potting for crustaceans on temperate rocky reef habitats: Implications for management. *Marine Environmental Research*, 105134.

Hawkins, S.J., O'Shaughnessy, K.A., Branch, G.M., Airoidi, L., Bray, S., Brooks, P., Burrows, M.T., Castilla, J.C., Crowe, T.P., Davies, T.W., Firth, L.B., Hiscock, K., Jenkins, S.R., Knights, A.M., Langmead, O., Leung, K.M.Y., Mieszkowska, N., Moschella, P., Steyl, I., Tidau, S., Whittington, M., Thompson, R.C., (2025). Hindsight informs foresight: revisiting millennial forecasts of impacts and status of rocky shores in 2025. *Marine Pollution Bulletin*, 219, 118214. Available at: <https://doi.org/10.1016/j.marpolbul.2025.118214>.

Hinchin H., Gallyot J., Carter ., Ferguson M., Webb K., Nelson M., and Jenkins C. (2021). Detecting the impacts on UK sublittoral rock communities of resuspended sediments from fishing activity. *Ecological Indicators*, 125:107545

JNCC (2019). H1170 Reefs - England. *Habitats Directive Article 17 Report 2019*. Available at: <https://jncc.gov.uk/jncc-assets/Art17/H1170-EN-Habitats-Directive-Art17-2019.pdf>

JNCC (2025). Habitats Regulations Report for Reefs. Unpublished draft assessment for the period 2019-2024.

Moore, P., and Smale, D. (2020). Impacts of climate change on shallow and shelf subtidal habitats relevant to the coastal and marine environment around the UK. *MCCIP Science Review 2020*, pp. 272–292

Mountford, E., Baulch, V. & Hill, E. (2025). Technical Documentation for the UK Biodiversity Indicator on the Extent of Natural Ecosystems: 2025 version. *JNCC Report 809*. JNCC, Peterborough, ISSN 0963-8091. <https://jncc.gov.uk/resources/ee44fbd1-81de-4c5b-8210-83a24e799555>.

NatureScot (2025). Habitats Regulations Report for Reefs. Unpublished draft assessment for the period 2019-2024.

NRW (2025). Habitats Regulations Report for Reefs. Unpublished draft assessment for the period 2019-2024.

OSPAR (2023). 'Benthic Habitats Thematic Assessment'. In: OSPAR, 2023: *Quality Status Report 2023*. OSPAR Commission, London. Available at: <https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/thematic-assessments/benthic-habitats/>

Stæhr, P.A.U., Carbonell, A., Guerin, L., Kabuta, S.H., Tidbury, H. and Viard, F. (2022). *Trends in New Records of Non-Indigenous Species (NIS) Introduced by Human Activities*. The OSPAR 2023 Quality Status Report for the Northeast Atlantic. Available at: <https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/indicator-assessments/trends-new-records-nis>

Woodcock K., Matear L., Duncombe-Smith S. and Vina-Herbon (2025). Extent of Physical Disturbance to Benthic Habitats: Fisheries with mobile bottom-contacting gears. *UK Marine Strategy 2024 assessment*. Available at: <https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/benthic-habitats/extent-of-physical-disturbance-to-benthic-habitats-fishing-mobile-gears/>